

**MONTANA PUBLIC EMPLOYEES
RETIREMENT ADMINISTRATION**

2003 EXPERIENCE STUDY

September 23, 2004

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September 23, 2004

Retirement Board
Public Employees Retirement Administration
State of Montana

RE: 2003 EXPERIENCE STUDY

Dear Members of the Board:

The Actuarial Valuations of the Systems as of July 1, 2004, will become the cornerstone for analyzing the funding status of the Systems, for analyzing the sufficiency of employer contribution rates, for disclosing employer liabilities on financial statements, and for analyzing the fiscal impact of proposed legislative amendments.

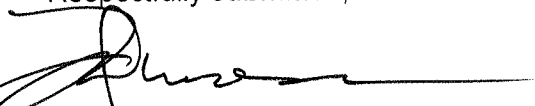
The purpose of this report is to communicate the results of our review of the actuarial methods and the economic and demographic assumptions to be used in the completion of the upcoming valuation. A few of our recommendations represent changes from the prior methods or assumptions, and are designed to better anticipate the emerging experience of the System.

In preparing this report, we relied without audit on information supplied by MPERA's staff. In our examination, after discussion with MPERA and certain adjustments, we have found the data to be reasonably consistent and comparable with data used for other purposes. It should be noted that if any data or other information is inaccurate or incomplete, our calculations might need to be revised.

Milliman has been engaged by MPERA as an independent actuary. The undersigned is a Fellow of the Society of Actuaries, a Member of the American Academy of Actuaries, and an Enrolled Actuary, and is qualified to perform experience studies for large public employee retirement systems.

Any distribution of this report must be in its entirety, including this cover letter, unless prior written consent is obtained from Milliman.

Respectfully submitted,



Mark O. Johnson, F.S.A.
Consulting Actuary

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MONTANA PUBLIC EMPLOYEES RETIREMENT ADMINISTRATION 2003 EXPERIENCE STUDY

SECTION 1

PURPOSE AND SCOPE OF THE STUDY

PURPOSE OF THE STUDY

The purpose of an actuarial valuation is to provide a timely best estimate of the ultimate costs of a retirement system in order to allocate them to the appropriate generations of taxpayers. The prospect of stable employer contributions will be enhanced if the methods and assumptions anticipate the emerging experience of the Systems and their members with reasonable accuracy.

The purpose of this study is to recommend a set of actuarial methods and assumptions for the 2004 Actuarial Valuations of the Systems. These methods and assumptions have been developed in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the applicable Standards of Practice adopted by the Actuarial Standards Board of the American Academy of Actuaries.

SCOPE OF THE STUDY

The actuarial valuation utilizes various actuarial methods and two different types of assumptions; economic and demographic. Economic assumptions are related to the general economy and its impact on the Systems, or to the operation of the Systems themselves. Demographic assumptions are based on the emergence of the specific experience of the Systems' members.

The MPERA Retirement Board has the sole authority to determine the actuarial assumptions and methods used in the actuarial valuation. In our opinion, the recommended assumptions are appropriate for the purposes of the valuation, are internally consistent, and reflect reasonable expectations. The assumptions reflect our best estimate of future conditions affecting MPERA. Nevertheless, the emerging costs of MPERA will vary from those presented in the valuations to the extent that actual experience differs from that projected by the assumptions.

All of the methods and assumptions that will be used in the 2004 Actuarial Valuations have been reviewed in this Study. The remainder of this report is organized in the following manner:

Section 2	Actuarial Methods
Section 3	Economic Assumptions
Section 4	Demographic Assumptions

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SECTION 2

ACTUARIAL METHODS

This section describes the actuarial cost method and the asset valuation method used to process the data and to determine the funded status and appropriate contribution rates.

	Current Actuarial Methods	Revised Actuarial Methods
Actuarial Cost Method		
Entry Age		-
Amortization Amount	Level Percent of Pay	-
Amortization Period		
All Systems except VFCA	30-Year Fixed Period	-
VFCA	19-Year Declining Period	20-Year Fixed Period
Asset Valuation Method		
Recognition Factor	25% of Gains or Losses	-
Corridor Limitation (Percent of Fair Value)	None	-

The only change we are recommending in the actuarial methods used in the Valuations is the amortization period for the VFCA. We describe our recommendations on the following pages.

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ACTUARIAL COST METHOD

A fundamental principal in financing the liabilities of a retirement system is that the cost of the benefits should be related to when those benefits are earned, rather than when they are paid. There are a number of methods in use for making such a determination. The most common, and the one that has been used for many years in MPERA actuarial valuations, is technically referred to as the Entry Age Actuarial Cost Method.

In our opinion, the Entry Age Method is the most appropriate method for a public system with the MPERA benefit structures because, given reasonable assumptions, this method is designed to produce stable employer contributions as a percent of future salaries. It is not surprising that the majority of statewide retirement systems use this actuarial cost method.

There are several elements of the cost method that determine how it is applied.

Method

The actuarial present value of projected benefits for each individual member included in the valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages. The portion of this actuarial present value allocated to a valuation year is called the Normal Cost. The portion of the actuarial present value of projected benefits not provided for at a valuation date by the actuarial present value of future Normal Costs is called the Actuarial Liability.

The excess of the Actuarial Liability over the Actuarial Value of Assets is called the Unfunded Actuarial Liability (UAL). If the Actuarial Value of Assets exceeds the Actuarial Liability, the difference is called the Actuarial Surplus.

The ages at entry of future active members are assumed to average the same as the entry ages of the present active members they replace. If the number of active members should increase (or decrease), it is further assumed that the average entry age of the larger (or smaller) group will be the same, from an actuarial standpoint, as that of the present active group. Under these assumptions, the Normal Cost Rates will not vary with the termination of the present active membership.

Amortization Amount

The Unfunded Actuarial Liability, or Actuarial Surplus, is amortized as a level percentage of future payroll, including increases in salaries due to general wage inflation, but assuming no change in the number of active members. This method is an essential element in maintaining future contributions as a level percentage of payroll.

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Because no payroll is obtained for volunteer firefighters, the amortization schedule for the Volunteer Firefighters' Compensation Act is based on an increasing dollar amount each year based on the rate of price inflation, rather than the rate of general wage inflation.

Amortization Period

The Unfunded Actuarial Liability (Actuarial Surplus) is being amortized as an increase (decrease) to the employer contribution rate over the fixed period.

- A test for sufficiency of the current contributions is performed to determine the amortization period of the Unfunded Actuarial Liability based on the current contributions in statute.
- If the current contributions will not amortize the Unfunded Actuarial Liability over a thirty-year period, a thirty-year contribution rate is calculated for a comparison.

The amortization period for the Volunteer Firefighters' Compensation Act has been declining each year. For the 2002 valuation, the amortization period was down to 21 years. If this pattern were continued, the amortization period would be 19 years in the 2004 valuation. At some point, the decline in the amortization would produce more volatility in the sufficiency test for the contributions.

We recommend the amortization for the VFCA be set at 20 years. In each future valuation, the Unfunded Actuarial Liability would be amortized over a new 20-year period.

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ASSET VALUATION METHOD

The audited financial statements of the MPERA are created as of June 30 of each year and reflect the Fair Value of Assets, sometimes referred to as Market Value. The valuation of assets for an actuarial valuation may be thought of in a different light than the valuation of assets for a retirement system's financial statement. The purpose in a financial statement disclosure is to make a representation of the current value of the assets on a fair value basis. Because the underlying calculations in the actuarial valuation are long-term in nature, and one of the goals of the actuarial valuation process is to ensure funding stability, it can be advantageous to smooth out short-term fluctuations in the fair value of assets.

The asset smoothing method will ratably recognize investment gains or losses over the four years subsequent to the valuation date. For example, in the 2004 actuarial valuation, 75% of the 2003-04 net investment gains will be held in the Asset Smoothing Reserve along with 50% of the net investment losses incurred in 2002-03 and 25% of the net investment losses incurred in 2001-02. Portions of the three years of net gains or losses are held in the Asset Smoothing Reserve, and all net investment gains or losses incurred prior to the 2001-02 fiscal year are fully recognized in the 2004 valuation.

To calculate the investment gain or loss, we calculate the expected Fair Value of Assets at the end of the year, based on the beginning of year Fair Market Values and the cash flow during the year. The expected earnings are added at the rate of 8%, net of all investment and administrative expenses.

We are not recommending any modifications to the asset smoothing method.

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SECTION 3

ECONOMIC ASSUMPTIONS

Actuarial Standard of Practice (ASOP) No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*, provides guidance to actuaries giving advice on selecting economic assumptions for measuring obligations under defined benefit plans, such as MPERA. Because no one knows what the future holds, the best an actuary can do is to use professional judgment to estimate possible future economic outcomes. These estimates are based on a mixture of past experience, future expectations, and professional judgment. The actuary should consider a number of factors, including the purpose and nature of the measurement, and appropriate recent and long-term historical economic data. However, the standard explicitly advises the actuary not to give undue weight to recent experience.

Recognizing that there is not one "right answer", the standard calls for the actuary to develop a best estimate range for each economic assumption, and then recommend a specific point within that range. Each economic assumption should individually satisfy this standard. Furthermore, with respect to any particular valuation, each economic assumption should be consistent with every other economic assumption over the measurement period.

In our opinion, the economic assumptions recommended in this report have been developed in accordance with ASOP No. 27. The following table shows our recommendations.

	Current Economic Assumptions	Recommended Revisions
Consumer Price Inflation	3.50%	3.25%
Wage Growth		
Real Wage Growth	1.00%	-
Total Wage Growth	4.50%	4.25%
Investment Return	8.00%	-

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CONSUMER PRICE INFLATION

Use in the Valuation: Future price inflation has an indirect impact on the results of the actuarial valuation through the development of the assumptions for wage growth, and investment returns.

The governing statutes provide that cost-of-living adjustments are calculated in two ways depending on the System. Most Systems include the Guaranteed Annual Benefit Adjustment (GABA) which is fixed at 3% per year after 12 months, regardless of inflation. Several Systems provide adjustments to certain retirees in proportion to the wage increases for active members, which again is not directly related to price inflation.

The current assumption for inflation is 3.50% per year.

Historical Perspective: We have used economic statistics that have been accumulated on a monthly basis published by the US Department of Labor. The data for inflation is based on the annual average of the national Consumer Price Index, US City Average, All Urban Consumers (CPI). The data for each year is documented in Exhibit 3.1. The tables below show the compounded annual inflation rate for various ten-year periods and for longer periods ended in December of 2003.

Period	CPI
1993-2003	2.4%
1983-1993	3.8
1973-1983	8.4
1963-1973	3.8
1953-1963	1.4

Period	Years	CPI
1993-2003	10	2.4%
1983-2003	20	3.1
1973-2003	30	4.9
1963-2003	40	4.6
1953-2003	50	3.9
1928-2003	75	3.2

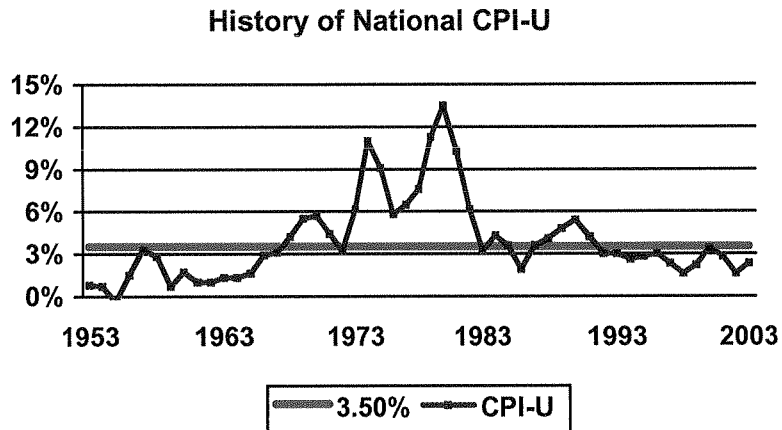
Splitting the last 75-year period into several segments shows a somewhat different historical picture. For example, the CPI for 1944 was 17.6 compared to 17.1 for 1928. Although there was some modest inflation during this period, there were also years of deflation. Over this entire 16-year period, inflation was essentially flat. The compounded annual rate of inflation between 1944 and 1967 was 2.8% per year. Over the next fifteen years, the annual rate was at its historical highs, and averaged about 7.3% per year. Since 1982, the inflation rate has averaged only 3.1%, which is closer to the long-term historical average since 1928.

Period	Years	Average CPI Increase
1928-1944	16	0.2%
1944-1967	23	2.8
1967-1982	15	7.3
1982-2003	21	3.1

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The following graph illustrates the annual increase in the CPI-U for the last 50 years.



Forecasts of Inflation: Many economists forecast inflation lower than the current assumption of 3.50%, but are looking at shorter periods than appropriate for a pension valuation. To find an economic forecast with a long enough time frame, we looked at the expected increase in the CPI by the Office of the Chief Actuary for the Social Security Administration. In the 2004 Trustees Report, the annual increase in the CPI over the next 30 years under the intermediate cost assumptions was 2.8%, down from 3.0% in the 2002 Trustees Report and 3.3% in the 2000 Trustees Report. The reasonable range was stated as 1.8% to 3.8% (down from 2.0% to 4.0% in the 2002 report and 3.0% to 4.2% in the 2000 report).

Reasonable Range and Recommendation: We agree with the Social Security projections that a range between 1.8% and 3.8% is reasonable for an actuarial valuation of a retirement system. We recommend that the long-term assumed inflation rate be reduced from 3.50% to 3.25% per year.

Consumer Price Inflation	
Current Assumption	3.50%
Reasonable Range	1.80% - 3.80%
Recommended Assumption	3.25%

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Exhibit 3.1
Consumer Price Index

Year	Index	Increase	Year	Index	Increase
1926	17.7		1966	32.4	2.9%
1927	17.4	(1.7)%	1967	33.4	3.1
1928	17.1	(1.7)	1968	34.8	4.2
1929	17.1	0.0	1969	36.7	5.5
1930	16.7	(2.3)	1970	38.8	5.7
1931	15.2	(9.0)	1971	40.5	4.4
1932	13.7	(9.9)	1972	41.8	3.2
1933	13.0	(5.1)	1973	44.4	6.2
1934	13.4	3.1	1974	49.3	11.0
1935	13.7	2.2	1975	53.8	9.1
1936	13.9	1.5	1976	56.9	5.8
1937	14.4	3.6	1977	60.6	6.5
1938	14.1	(2.1)	1978	65.2	7.6
1939	13.9	(1.4)	1979	72.6	11.3
1940	14.0	0.7	1980	82.4	13.5
1941	14.7	5.0	1981	90.9	10.3
1942	16.3	10.9	1982	96.5	6.2
1943	17.3	6.1	1983	99.6	3.2
1944	17.6	1.7	1984	103.9	4.3
1945	18.0	2.3	1985	107.6	3.6
1946	19.5	8.3	1986	109.6	1.9
1947	22.3	14.4	1987	113.6	3.6
1948	24.1	8.1	1988	118.3	4.1
1949	23.8	(1.2)	1989	124.0	4.8
1950	24.1	1.3	1990	130.7	5.4
1951	26.0	7.9	1991	136.2	4.2
1952	26.5	1.9	1992	140.3	3.0
1953	26.7	0.8	1993	144.5	3.0
1954	26.9	0.7	1994	148.2	2.6
1955	26.8	(0.4)	1995	152.4	2.8
1956	27.2	1.5	1996	156.9	3.0
1957	28.1	3.3	1997	160.5	2.3
1958	28.9	2.8	1998	163.0	1.6
1959	29.1	0.7	1999	166.6	2.2
1960	29.6	1.7	2000	172.2	3.4
1961	29.9	1.0	2001	177.1	2.8
1962	30.2	1.0	2002	179.9	1.6
1963	30.6	1.3	2003	184.0	2.3
1964	31.0	1.3			
1965	31.5	1.6			

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WAGE GROWTH

Use in the Valuation: Estimates of future salaries are based on two types of assumptions. Rates of increase in the general wage level of the membership are directly related to inflation, while individual salary increases due to promotion and longevity (merit) occur even in the absence of inflation. The merit salary scale will be reviewed with the other demographic assumptions.

The current wage growth assumption is 1.00% above inflation, or 4.50% per year.

Historical Perspective: We have used statistics from the Social Security System on the National Average Wage back to 1951. For years prior to 1951, we studied the Total Private Nonagricultural Wages as published in *Historical Statistics of the U.S., Colonial Times to 1970*. The data for each year is documented in Exhibit 3.2. For consistency with our observations of other indices, the table below shows the compounded annual rates of wage growth for various ten-year periods, and for longer periods ended in 2003.

Decade	Wages
1993-2003	4.1%
1983-1993	4.3
1973-1983	7.2
1963-1973	5.6
1953-1963	3.4

Period	Years	Wages
1993-2003	10	4.1%
1983-2003	20	4.2
1973-2003	30	5.2
1963-2003	40	5.3
1953-2003	50	4.9
1928-2003	75	4.6

The excess of wage growth over price inflation represents the increase in the standard of living, also called productivity growth, or real wage growth. In general, real wage growth had been decreasing until recently. The following table shows the compounded wage growth over various periods, along with the comparable inflation rate for the same period. The differences represent rates of real wage growth.

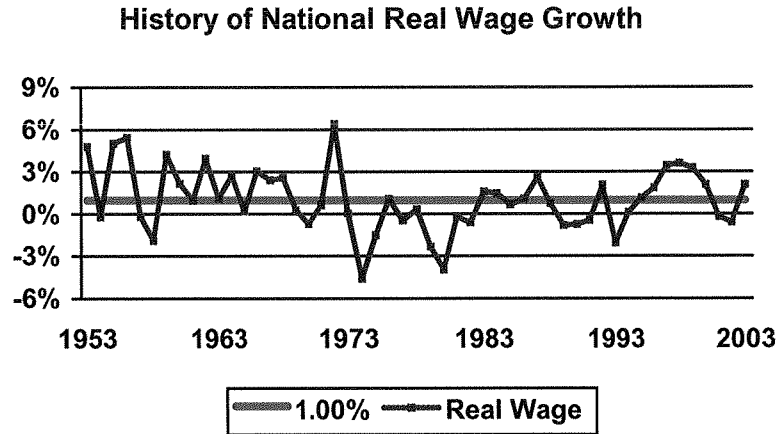
Decade	Wage Growth	CPI Incr.	Real Wages
1993-2003	4.1%	2.4%	1.7%
1983-1993	4.3	3.8	0.5
1973-1983	7.2	8.4	(1.2)
1963-1973	5.6	3.8	1.8
1953-1963	3.4	1.4	2.0

Period	Wage Growth	CPI Incr.	Real Wages
1993-2003	4.1%	2.4%	1.7%
1983-2003	4.2	3.1	1.1
1973-2003	5.2	4.9	0.3
1963-2003	5.3	4.6	0.7
1953-2003	4.9	3.9	1.0
1928-2003	4.6	3.2	1.4

There has been debate on the issue of whether public sector employees will receive, over the long term, the same rewards for productivity as employees in the private sector, where productivity is more readily measurable. To my knowledge, no definitive research has been completed on this topic. Nevertheless, it is my opinion that public sector employees must be

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rewarded, even if there is a time lag, with the same productivity increases as those participating in the remainder of the economy.



Forecasts of Future Wages: The wage index we used for the historical analysis has been projected forward by the Office of the Chief Actuary of the Social Security Administration. In the 2004 Trustees Report, the long-term annual increase in the National Average Wage is 1.1% higher than the Social Security intermediate inflation assumption of 2.8% per year. The range of the assumed real wage growth in the 2004 Trustees Report was from 0.6% to 1.6% per year.

Reasonable Range and Recommendation: We concur that a range between 0.60% and 1.60% is reasonable for the actuarial valuation. We recommend that the long-term assumed real wage inflation rate be retained at 1.00% per year.

Real Wage Growth	
Current Assumption	1.00%
Reasonable Range	0.60% - 1.60%
Recommended Assumption	1.00%

Due to our recommendation that the inflation assumption be lowered from 3.50% to 3.25%, the total wage inflation rate will also decrease from 4.50% to 4.25% per year. The impact of this change will generally be a reduction in liabilities.

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Exhibit 3.2
Wage Index

Year	Index	Increase	Year	Index	Increase
1926	\$1,130.11		1966	\$ 4,938.36	6.0%
1927	1,159.14	2.6%	1967	5,213.44	5.6
1928	1,162.53	0.3	1968	5,571.76	6.9
1929	1,196.88	3.0	1969	5,893.76	5.8
1930	1,164.95	(2.7)	1970	6,186.24	5.0
1931	1,086.09	(6.8)	1971	6,497.08	5.0
1932	954.02	(12.2)	1972	7,133.80	9.8
1933	892.58	(6.4)	1973	7,580.16	6.3
1934	929.34	4.1	1974	8,030.76	5.9
1935	968.53	4.2	1975	8,630.92	7.5
1936	1,008.20	4.1	1976	9,226.48	6.9
1937	1,071.58	6.3	1977	9,779.44	6.0
1938	1,047.39	(2.3)	1978	10,556.03	7.9
1939	1,076.41	2.8	1979	11,479.46	8.7
1940	1,106.41	2.8	1980	12,513.46	9.0
1941	1,228.81	11.1	1981	13,773.10	10.1
1942	1,455.70	18.5	1982	14,531.34	5.5
1943	1,661.79	14.2	1983	15,239.24	4.9
1944	1,796.28	8.1	1984	16,135.07	5.9
1945	1,865.46	3.9	1985	16,822.51	4.3
1946	2,009.14	7.7	1986	17,321.82	3.0
1947	2,205.08	9.8	1987	18,426.51	6.4
1948	2,370.53	7.5	1988	19,334.04	4.9
1949	2,430.52	2.5	1989	20,099.55	4.0
1950	2,570.33	5.8	1990	21,027.98	4.6
1951	2,799.16	8.9	1991	21,811.60	3.7
1952	2,973.32	6.2	1992	22,935.42	5.2
1953	3,139.44	5.6	1993	23,132.67	0.9
1954	3,155.64	0.5	1994	23,753.53	2.7
1955	3,301.44	4.6	1995	24,705.66	4.0
1956	3,532.36	7.0	1996	25,913.90	4.9
1957	3,641.72	3.1	1997	27,426.00	5.8
1958	3,673.80	0.9	1998	28,861.44	5.2
1959	3,855.80	5.0	1999	30,469.84	5.6
1960	4,007.12	3.9	2000	32,154.82	5.5
1961	4,086.76	2.0	2001	32,921.92	2.4
1962	4,291.40	5.0	2002	33,252.09	1.0
1963	4,396.64	2.5	2003 est.	34,730.66	4.4
1964	4,576.32	4.1			
1965	4,658.72	1.8			

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INVESTMENT RETURN

Use in the Valuation: The investment return assumption is one of the primary determinants in the allocation of the expected cost of the Systems' benefits, providing a discount of the future benefit payments to reflect the time value of money.

The current assumption for investment return is 8.00% per year, net of all investment-related and administrative expenses.

Historical Perspective: One of the inherent problems with analyzing historical data is that the results can look significantly different depending on the time frame used because the year-to-year results vary widely. Furthermore, the historical approach we used to predict inflation does not necessarily reflect current expectations for future capital markets returns. Even though history provides a valuable perspective for setting this assumption, the economy of the past is not necessarily the economy of the future.

Projection Model using Capital Market Assumptions: In our opinion, projecting future returns from capital market assumptions is a better approach than only looking at the past. We obtained capital market assumptions from three sources and summarized them below.

Asset Class	Montana BOI		CalSTRS		Oregon PERS	
	Real Return	Volatility	Real Return	Volatility	Real Return	Volatility
US Equities	6.3%	17.0%	6.8%	22.0%	7.0%	15.7%
Int'l Equities	6.8	20.0	6.8	22.0	8.0	19.4
Private Markets	10.7	30.0	10.0	35.0	13.5	35.0
Fixed Income	1.8	8.0	3.3	8.0	2.4	5.0
Cash	0.1	0.7	2.0	1.5	1.0	1.3
Average Portfolio	4.9%	11.9%	5.6%	14.5%	5.7%	10.8%

- Montana Board of Investments (BOI): These assumptions were provided to Milliman this year for a study of the investment return for the Teachers' Retirement System. This set of assumptions is more conservative than the other two sets, which may be due to the fact that it was derived for an investment horizon covering only the next five years. At this time a longer horizon would likely increase the expected returns.
- California State Teachers' Retirement System (CalSTRS): This assumption set was provided to Milliman in late 2003 for an experience study. The in-house investment staff of CalSTRS plus their outside investment advisors developed this set of assumptions that has a long-term horizon of about 25 years.
- Oregon Public Employees Retirement System (Oregon PERS): The third set was provided to Milliman in 2004 for an experience study. These assumptions were developed for the Oregon Investment Council with a multi-cycle time horizon. It is the most aggressive of the three.

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The average portfolio returns in the previous table were developed for a one-year period based on the June 30, 2003 asset allocation by asset class. For this purpose, mortgages have been combined with fixed income investments. The asset allocation is shown below.

Asset Class	Asset Allocation
US Equities	49%
Int'l Equities	8
Private Markets	<u>6</u>
Total Equities	63%
Fixed Income	35
Cash	<u>2</u>
Total Fixed	37%
Total	100%

These assumptions, combined with the asset allocation, produce a relatively high real rate of return over a one-year period. Due to the volatility of the portfolio, we need to predict the real rates of return over many years. The average return over an extended period will be lower than the average return over one year, but the range of possible returns will narrow over time.

A formula-based model was used to predict future returns based on these capital market assumptions, the asset allocation policy, and assumed annual rebalancing of the portfolio. We used these capital market assumptions to generate expected returns over a period of thirty years. The model assumes that investment returns are lognormally distributed and are based on mathematical formulas from *The Long-Term Expected Rate of Return: Setting it Right* by Olivier de la Grandville as published in the Financial Analysts Journal, Nov/Dec 1998.

The results are summarized in the following table for the Montana BOI assumption set.

Invest. Period	Mean Return	Std. Dev.	Percentile Results				
			5th	25th	50th	75th	95th
<u>Montana BOI</u>							
1 year	4.9%	11.9%	(13.4)%	(3.4)%	4.2%	12.5%	25.5%
5 years	4.4	5.3	(4.0)	0.8	4.2	7.9	13.3
10 years	4.3	3.7	(1.7)	1.8	4.2	6.8	10.5
20 years	4.3	2.6	0.0	2.5	4.2	6.0	8.7
30 years	4.3	2.2	0.8	2.8	4.2	5.7	7.8

In the first year, the mean real rate of return is 4.9%, but due to the volatility associated with the asset allocation, the range of probable outcomes is quite large. For example, in the first year there is a 5% chance the return will be less than (13.4)% and a 5% chance it will be greater than 25.5%. As the investment period lengthens, the range of cumulative average results

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narrows due to the dynamics of a diversified portfolio. As the number of years in our forecast increases, the average annualized return approaches the mean.

We ran the model for the two other assumption sets with the following results.

Invest. Period	Mean Return	Std. Dev.	Percentile Results				
			5th	25th	50th	75th	95th
<u>CalSTRS</u>							
1 year	5.6%	14.5%	(16.4)%	(4.5)%	4.6%	14.7%	31.0%
5 years	4.8	6.4	(5.3)	0.4	4.6	9.0	15.7
10 years	4.7	4.5	(2.5)	1.6	4.6	7.7	12.3
20 years	4.7	3.2	(0.5)	2.5	4.6	6.8	10.0
30 years	4.7	2.6	0.4	2.9	4.6	6.4	9.0
<u>Oregon PERS</u>							
1 year	5.7%	10.8%	(10.7)%	(1.6)%	5.2%	12.5%	23.9%
5 years	5.3	4.8	(2.2)	2.1	5.2	8.4	13.2
10 years	5.2	3.4	(0.1)	3.0	5.2	7.4	10.8
20 years	5.2	2.4	1.4	3.6	5.2	6.8	9.1
30 years	5.2	2.0	2.1	3.9	5.2	6.5	8.4

These three sets of assumptions produce median returns that are quite far apart (4.2%, 4.6%, and 5.2%). We decided to use the CalSTRS assumption set. The Montana BOI assumptions are for a much shorter horizon (5 years) than we will be using in the valuation. The Oregon PERS assumptions produce the highest expected returns.

Total Return: To arrive at a projected total return, including inflation, add the recommended inflation assumption geometrically $[(1 + \text{real return}) \times (1 + \text{inflation}) - 1]$. The following table shows the total assumed return using the CalSTRS assumption set.

	Percentile Results at 30-Year Horizon				
	5th	25th	50th	75th	95th
Real Rate of Return	0.4%	2.9%	4.6%	6.4%	9.0%
Total Rate of Return	3.7	6.2	8.0	9.9	12.5

Investment-Related and Administrative Expenses: The investment return is assumed to be net of all investment-related and administrative expenses. History has shown that this has been an appropriate method of recognizing expenses.

The following table shows the ratio of investment and administrative expenses to assets over the last seven years taken from the financial statements for years ending on June 30. The expense ratio is calculated as the total expense divided by the average asset balance during the year assuming uniform cash flows.

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(\$000)	Investment Expenses	Admin. Expenses	Total Expenses	Average Assets	Expense Ratio
1997	\$1,587	\$1,208	\$2,795	\$ 2,281,746	0.12%
1998	1,919	1,341	3,260	2,693,663	0.12
1999	2,174	1,479	3,653	3,072,230	0.12
2000	3,047	1,965	5,012	3,368,841	0.15
2001	3,286	2,784	6,070	3,404,708	0.18
2002	4,323	3,531	7,854	3,192,902	0.25
2003	4,021	2,430	6,451	3,154,744	0.20

Based on this data, the annual investment and administrative expenses represent about 0.2% of the Systems' assets.

Reasonable Range and Recommendation: Based on the ASOP No. 27 guidelines, we conclude that a reasonable range for the total rate of investment return is from 6.2% to 9.9%, including inflation at 3.25% per year. This range is lowered to reflect the expenses assumed to be paid from the investment return (0.2%).

Components of Return	Percentile Results		
	25th	50th	75th
Total Rate of Return	6.2%	8.0%	9.9%
Assumed Expenses	<u>(0.2)</u>	<u>(0.2)</u>	<u>(0.2)</u>
Net Investment Return	6.0%	7.8%	9.7%

Based on this method and the capital market assumptions described above, we believe that a range of 6.0% to 9.7% is reasonable for an actuarial valuation of a retirement system with the current MPERA asset allocation policy. We believe an investment return assumption of 8.0% per year is consistent with the level of inflation and real rate of return likely to occur over an extended period of time, net of expenses.

An 8.00% assumed rate means that the assumed real rate of return is 4.79% per year. $[(1.08+0.002) / 1.0325]-1$. This falls at the 52nd percentile on the distribution of returns based on the selected assumption set. Therefore, we could expect to earn a real rate of return of at least 4.79% over a 30-year period about 48% of the time.

Based on the input from several sources outlined above and our independent analysis, we recommend that the net investment return assumption remain at 8.00% per year.

Investment Return (Portfolio)	
Current Assumption	8.00%
Reasonable Range	6.00% - 9.70%
Recommended Assumption	8.00%

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SECTION 4

DEMOGRAPHIC ASSUMPTIONS

Actuarial Standard of Practice (ASOP) No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*, provides guidance to actuaries giving advice on selecting demographic assumptions for defined benefit plans, such as MPERA. In our opinion, the demographic assumptions recommended in this report have been developed in accordance with ASOP No. 35.

The purpose of a study of demographic experience is to compare what happened to the membership during the study period (July 1, 1999, through June 30, 2003; and through June 30, 2004 for mortality) with what was expected to happen based on the assumptions used in the most recent Actuarial Valuation. The text and chart headings make a clear distinction about the length of the study period for each assumption.

Studies of demographic experience involve several steps.

- First, the number of members changing membership status, called decrements, during the study are tabulated by age, sex, duration, or class of membership.
- Next, the number of members expected to change status is calculated by multiplying certain membership statistics, called the exposure, by the expected rates of decrement.
- Then, the number of actual decrements is compared with the number of expected decrements. The comparison is called the actual to expected ratio (A/E Ratio).

If the actual experience differs significantly from the overall expected results, or if the pattern of actual decrements or rates of decrement by age, sex, or duration does not follow the expected pattern, new assumptions are considered. Recommended revisions normally are not an exact representation of the experience during the observation period. Judgment is required to predict future experience from past trends and current evidence, including a determination of the amount of weight to assign to the most recent experience.

Revised rates of decrement are tested by using them to recalculate the expected number of decrements during the study period, and the results are shown as revised A/E Ratios.

The remainder of this section presents the results of the demographic study. We have prepared tables that show a comparison of the actual and expected decrements and the overall ratio of actual to expected results under the current assumptions. We then show the comparable A/E Ratios from the previous observation periods, if applicable, and if a change is being proposed, the revised A/E Ratios are shown as well.

Salary adjustments, other than the economic assumption for wage inflation, are treated as demographic assumptions. However, a different method of investigation is needed for salaries than is used for the decrements. These adjustments have been analyzed with historical data as described later in this section.

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The following list shows the demographic assumptions we reviewed, all of which are based on the experience of the membership. We are making recommendations for changing some of the demographic assumptions.

All Assumptions Based on System Experience	
	Recommended Revisions
Mortality	
Healthy Retired Members	yes
Beneficiaries	yes
Disabled Members	yes
Active Members	yes
Service Retirement	
Retirement from Active Membership Status	yes
MPORS DROP	yes
Retirement from Vested Membership Status	-
Purchases of Credited Service	-
Disability	
Duty Disability	-
Ordinary Disability	-
Recovery from Disability	-
Other Terminations of Membership	
Termination	yes
Probability of Refunds	-
Merit Salary Scale	-

It takes a fair amount of data to perform a credible study of demographic assumptions. Because the JRS membership is relatively small, some assumptions for judge members have been selected purely on our judgment of reasonable future outcomes.

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MORTALITY

The life expectancies of current and future retirees are predicated on the assumed rates of mortality at each age. It is commonly known that rates of mortality have been declining over a number of decades, which means people, in general, are living longer. The mortality experience of this System has generally improved over the years, and we have recommended revisions periodically to anticipate these improvements. An A/E Ratio in excess of 100% for mortality indicates there is a margin for future mortality improvements because we are predicting fewer deaths than actually occurred.

Because of clear differences in mortality rates, we studied healthy retirees, disabled retirees and active members separately.

Healthy Retired Members: For the retired member mortality assumption, if the A/E Ratio is greater than 100%, we have prudently predicted fewer deaths than actually occurred, and therefore have built in some margin for future mortality improvements. Note we have not studied deaths for female uniformed members since the data set was too small to be credible. The observed A/E Ratios are shown in the following chart for the prior four-year period.

Healthy Retirees	2000-2004 Observations			1995-2000 A/E Ratio
	Actual	Expected	A/E Ratio	
PERS				
Male	889	891	100%	109%
Female	709	677	105	107
Uniformed Systems				
Male	68	81	84	113
Totals	1,666	1,649	101%	109%

The 1995-2000 A/E Ratio represents the margin we anticipated when the assumption was revised two years ago. During the course of this year's study, we discovered a problem with the data we have been receiving for this and the prior study. After discussion with the MPERA staff we have corrected the problem, but the data issue influenced our revisions in the mortality assumptions four years ago.

There is a data field labeled "member's death date" in each retiree's record. In fact, we now know this field does not necessarily contain the member's date of death, but rather the stop payment date for the benefit of either the member or the beneficiary. We have discovered records with a "member's death date" in this study for which we thought there already was a death during the previous study. The result is that we observed more deaths than actually occurred in the prior study due to counting a number of beneficiary deaths as if they were member deaths.

In the prior study we adjusted the mortality assumption according to the observed data, and now we see that, particularly for the males, we are experiencing fewer deaths than we thought we would. This issue affected males more than females (presumably males have more

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beneficiaries than females) and the uniformed groups were affected the most (presumably because of the prevalence of automatic survivor benefits).

Our recommendation is to retain the current mortality assumption for PERS females and to adjust the mortality for the two male groups. The assumption for the PERS females still contains a 5% margin. However, the changes in the A/E Ratios for the males are enough to warrant a modification to put some margin back in the assumptions. The following shows that our recommendation is to add a one-year adjustment to the PERS male mortality table and to add a two-year adjustment to the uniformed male mortality tables.

Healthy Retirees	<u>Current Assumption</u>	<u>Recommendation</u>
PERS & JRS		
Male	UP 1994 Male	UP 1994 Male (-1 year)
Female	UP 1994 Female (-1 year)	UP 1994 Female (-1 year)
Uniformed Systems		
Male	UP 1994 Male (+1 year)	UP 1994 Male (-1 year)

The result will be that all males will be valued on the same table and all females will be valued on the same table. The resulting A/E Ratios will be as follows.

Healthy Retirees	<u>2000-2004 Observations</u>			2000-2004	1995-2000
	Actual	Revised Expected	Revised A/E Ratio	Observed A/E Ratio	A/E Ratio
PERS					
Male	889	810	110%	100%	109%
Female	709	677	105	105	107
Uniformed Systems					
Male	68	67	102	84	113
Totals	1,666	1,554	107%	101%	109%

The impact of this recommendation will be an increase in the Actuarial Liabilities due to the expectation of a different pattern of mortality, including longer life expectancies for male members. The adjustments correct the data problem contained in the last study.

Beneficiaries: The mortality of beneficiaries applies to the survivors of members who have elected a joint and survivor option. There is never complete data on the mortality experience of beneficiaries prior to the death of the member, because there is no expectation that the death will be reported to MPERA if the member is still alive, other than for a pop-up annuity form.

We recommend a continuation of the assumption that beneficiaries exhibit the same mortality patterns as healthy PERS retirees, which is a standard convention. Therefore, the mortality for male beneficiaries will be changed.

Disabled Members: The valuation assumes that disabled retirees, in general, will not live as long as service retired members. The following chart shows the actual and expected deaths for

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disabled members. There tends to be more fluctuation in disabled mortality experience than in the healthy mortality experience because of different types of disabilities, and also because there are many fewer retirees in this category.

As with the healthy retiree mortality, we saw fewer reported deaths than we expected because our assumption was recommended from data that overstated deaths. The data issue was significant with disabled retirees because more of them are likely to select a benefit form with a survivorship feature.

Disabled Retirees	<u>2000-2004 Observations</u>			1995-2000 A/E Ratio
	Actual	Expected	A/E Ratio	
PERS				
Male	73	81	90%	110%
Female	48	52	93	111
Uniformed Systems				
Male	21	21	101	109
Totals	142	154	92%	110%

Based on the information shown above for the four-year period, we are recommending that two years be subtracted from the disabled mortality assumption for PERS members. No change is recommended for the uniformed service members.

Disabled Retirees	<u>Current Assumption</u>	<u>Recommendation</u>
PERS & JRS		
Male	Rev. Rul 96-7 Male (-1 year)	Rev. Rul 96-7 Male (-3 year)
Female	Rev. Rul 96-7 Female (+3 years)	Rev. Rul 96-7 Female (+1 year)

Due to the volatility in disabled mortality, and the fact that the number of observed deaths was relatively small, we did not adjust the mortality to add any further margins. We will continue to closely monitor disabled mortality in the future. The resulting A/E Ratios will be as follows.

Disabled Retirees	<u>2000-2004 Observations</u>			2000-2004 Observed A/E Ratio	1995-2000 A/E Ratio
	Actual	Revised Expected	Revised A/E Ratio		
PERS					
Male	73	74	99%	90%	110%
Female	48	47	103	93	111
Uniformed Systems					
Male	21	21	101	101	109
Totals	142	142	100%	92%	110%

The impact of this recommendation will be an increase in the Actuarial Liabilities due to the expectation of a different pattern of mortality, including longer life expectancies for disabled members.

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Active Members: There were not a sufficient number of pre-retirement deaths to credibly measure this assumption. Therefore, we will recommend the selection of an assumption based on our experience with other systems.

We recommend a continuation of the assumption that active members exhibit the same mortality patterns as healthy PERS retirees. Therefore, the mortality for active members will be changed to reflect the modifications to the retiree mortality.

Actuarial Equivalency Tables: Because we are recommending revisions to the assumed mortality of retirees and beneficiaries, we will present recommendations for modifications to the current Actuarial Equivalency Factors in the near future.

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SERVICE RETIREMENT

The service retirement assumption predicts the change in status from active membership directly to retirement, and the retirement patterns of the many retirees who terminated active membership months or years prior to their retirement.

Retirement from Active Membership Status: The following table shows the number of actual and expected service retirements during the 1999-2003 observation period compared to the 1995-1999 period. The right-hand column shows the total for the previous four years.

Service Retirement	1999-2003 Observations		A/E Ratio	1995-1999 A/E Ratio
	Actual	Expected		
PERS				
Under 30 years	1,779	1,953	91%	101%
30 or more years	312	285	109	109
Total	2,091	2,238	93%	102%
Uniformed Systems				
MPORS	53	57	93	101
GWPORS	7	7	100	92
SRS	72	73	99	105
HPORS	25	18	139	104
FURS	62	50	124	100
Total	219	205	107%	101%
Totals	2,310	2,443	95%	102%

Overall, retirement rates were down in the four-year observation period but there were higher rates for several of the Systems. The relatively smaller size of the uniformed Systems means that we can expect more volatility. Our recommendation is to retain the current assumptions for the uniformed Systems.

We are recommending a slight revision to the retirement rates for PERS members who retire with less than 30 years of service. The following table shows the rates from ages 55 through 59 that we believe should be modified. The actual rates were close to our predictions at the other ages, so the remainder of the rates will stay the same.

PERS Service Retirements - Under 30 Years		
Age	Current Rate	Recommended Rate
55	8%	3%
56	5	4
57	5	5
58	5	5
59	5	6

The next table shows the revised A/E Ratios for PERS and the totals based on this change.

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Service Retirement	1999-2004 Observations			1999-2004 Observed A/E Ratio	1995-1999 A/E Ratio
	Actual	Revised Expected	Revised A/E Ratio		
PERS					
<i>Under 30 years</i>	1,779	1,841	97%	91%	101%
30 or more years	<u>312</u>	<u>285</u>	<u>109</u>	<u>109%</u>	<u>109</u>
Total	2,091	2,126	98%	93%	102%
Uniformed Systems					
MPORS	53	57	93	93	101
GWPORS	7	7	100	100	92
SRS	72	73	99	99	105
HPORS	25	18	139	139	104
FURS	<u>62</u>	<u>50</u>	<u>124</u>	<u>124</u>	<u>100</u>
Total	219	205	107%	107%	101%
Totals	2,310	2,443	99%	95%	102%

MPORS DROP: The MPORS has added a Deferred Retirement Option Plan feature since the last experience study for which we have not had an explicit assumption. We studied the members electing the DROP and developed a recommended assumption. There were 27 members who entered the DROP in 2002-03 and five who entered in 2003-04. This indicates there was pent up demand for the DROP and we could not use the 2002-03 data for the analysis. All five members who entered the DROP in 2003-04 had 20 years of service. There were 15 members who could have elected the DROP, so the percentage of members electing the DROP was 33% in the 2003-04 year. Although this statistic is not based on a significant amount of credible data, we recommend that the valuation include an assumption that 33% of the members elect to participate in the DROP at the attainment of 20 years of service.

We will assume the DROP period is equal to the specific election by the DROP participant for members who are in the DROP. For purposes of projecting the liabilities associated with future DROP participants, we will assume a DROP period of five years.

If a significant number of members elect the DROP at 20 years, the rate of retirement shortly thereafter may decline. However, the sum of the MPORS members who actually retired plus those that entered the DROP exceeded our assumed number of retirements. Therefore, we recommend that the retirement rates remain at the current levels for the time being.

Keep in mind that our predictions about the DROP are based on very little data. We will continue to monitor these assumptions, including during the interim before the next experience study to ensure we are using the most up-to-date information in our projections.

Retirement from Vested Terminated Status: It is appropriate to continue to assume that all vested terminated members retire when first eligible for an unreduced benefit.

Purchases of Credited Service: For purposes of the actuarial valuation, we categorize service purchases into two categories. We are not recommending any changes in the manner in which we allocate employer costs, if any, for purchases of Credited Service.

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- **Full Cost Service Purchases:** Some service purchases are transacted by charging the member the full actuarial cost of the purchase. If the actuarial factors used to calculate the purchase cost are based on the same mortality and interest assumptions used in the actuarial valuations, then there may be only a minor impact on the projected liabilities. There is generally always some cost due to the specific individual circumstances of each member who is deciding to purchase the service compared to the factors that are based on an “average” cost.
- **All Others:** We understand the following types of purchases are funded entirely by the member or the employer: Military, Public Service, Additional Service (“1-for-5”), and Reduction-in-Force. These types of purchases could create additional liabilities:

Retroactive Service Purchases

Our understanding is that this is used very rarely, and we recommend they be included as actuarial losses in the valuation after the purchase is recorded.

Refunds

We are recommending that the valuations implicitly recognize the purchase of refunded service time. The rates of termination from active membership (discussed later in this section) were calculated net of rehired members. Therefore, when a member leaves, takes a refund, and is rehired, the actuarial loss from the reinstatement of service is offset by the actuarial gain at the time of termination. This is a standard convention for dealing with this issue.

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DISABLEMENT

The table below indicates the number of actual and expected permanent disabilities during the four-year study period, the number expected, and the A/E Ratios.

Disablement	<u>1999-2003 Observations</u>			<u>1995-1999</u>
	Actual	Expected	A/E Ratio	A/E Ratio
PERS				
Male	58	73	79%	100%
Female	54	64	85	101
Uniformed Systems				
Male	13	21	61	101
Totals	125	158	79%	101%

Disability rates have historically fluctuated from study to study. The assumed rates of disability were revised in the previous study. Although an A/E Ratio of 79% appears low, and we clearly overestimated the number of disabilities in the last four-year period, we are recommending that the current assumptions be retained.

Due to the order of magnitude of the numbers, a difference of only a few disabilities would dramatically change the A/E Ratios. For example, if there had been only two more disabilities each year for all of the uniformed Systems, the A/E Ratio would have been 100% instead of only 61%.

Duty Disability: Several systems have a distinct duty-related disability benefit. Based on information obtained from the staff, we recommend that we continue to assume 10% of all disabilities to be duty-related disabilities.

Recovery from Disability: We will continue to assume that all disabilities, duty and ordinary, are permanent and no disabled member will recover and return to work. If a member recovers from a disability, an actuarial gain will emerge in the subsequent valuation.

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OTHER TERMINATIONS OF EMPLOYMENT

Terminations: The following chart shows the actual and expected number of terminations for causes other than retirement, death, or disability. The 1995-1999 A/E Ratios are those developed in the prior study after the termination rates were revised.

Terminations	1999-2003 Observations		A/E Ratio	1995-1999 A/E Ratio
	Actual	Expected		
PERS				
Male	4,333	3,922	110%	109%
Female	<u>6,183</u>	<u>5,570</u>	<u>111</u>	<u>109</u>
Total	10,516	9,492	111%	109%
Uniformed Systems				
MPORS	116	85	137	108
GWPORS	228	134	169	102
SRS	173	151	115	103
HPORS	17	41	41	103
FURS	<u>21</u>	<u>17</u>	<u>123</u>	<u>108</u>
Total	555	428	130%	104%
Totals	11,071	9,920	112%	108%

The overall results for 1999-2003 appear to be fairly consistent with the revised assumptions we recommended in the last study for PERS, so we are not recommending any changes for PERS. The other Systems experienced higher turnover than anticipated except for HPORS, which experienced lower turnover in the four-year period.

We revised all of the withdrawal assumptions four years ago. Turnover can go through cycles and we will continue to monitor these Systems for a pattern. Except for GWPORS, we are not recommending any changes to the withdrawal assumptions at this time.

The GWPORS is different because of the impact of the transfer of employees of the Department of Corrections from the Public Employees' Retirement System to the GWPORS. The employee turnover assumptions for the last actuarial valuation of GWPORS were set prior to the completion of the transfers. You can see that the A/E Ratio is significantly higher for the GWPORS. Therefore, we recommend adjusting the turnover rates.

GWPORS Terminations					
Service	Current Rate	Recommended Rate	Service	Current Rate	Recommended Rate
0	18%	20%	5 - 9	1%	5%
1	5	15			
2	4	10	10 - 14	1	5
3	4	6			
4	3	6	15 - 19	1	5

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The next table shows the revised A/E Ratios for and the totals based on this change.

Terminations	1999-2003 Observations			1999-2003 Observed A/E Ratio	1995-1999 A/E Ratio
	Actual	Revised Expected	Revised A/E Ratio		
PERS					
Males	4,333	3,922	110%	110%	109%
Females	<u>6,183</u>	<u>5,570</u>	<u>111</u>	<u>111</u>	<u>109</u>
Total	10,516	9,492	111%	111%	109%
Uniformed Systems					
MPORS	116	85	137	137	108
GWPORS	228	224	102	169	102
SRS	173	151	115	115	103
HPORS	17	41	41	41	103
FURS	<u>21</u>	<u>17</u>	<u>123</u>	<u>123</u>	<u>108</u>
Total	555	518	107%	130%	104%
Totals	11,071	10,010	111%	111%	108%

Probability of Refunds: Based on the data from this study period, some vested members elect to take a refund at termination. This is consistent with the experience we have seen in other systems. The observed data indicates that age is the most important factor in determining who will elect to withdraw their contributions from the system and forfeit future benefits.

We assume all non-vested terminated members will receive refunds.

The following experience was developed from the four-year observation period.

Refunds Age at Termination	1999-2003 Observations					
	PERS Only			Uniformed Systems		
	Actual	Expected	A/E Ratio	Actual	Expected	A/E Ratio
Under 35	49%	60%	81%	66%	70%	94%
35 - 39	41	50	82	59	60	98
40 - 44	42	40	104	30	40	75
45 - 49	37	25	146	50	40	125
50 & over	33	25	132		-	

Based on the data in this study, a greater number of members are electing to keep their contributions in PERS that have been assumed. We are recommending the following changes.

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Refunds Age at Termination	1999-2003 Observations		
	PERS Only		
	Actual	Revised Expected	Revised A/E Ratio
Under 35	49%	50%	98%
35 - 39	41	40	102
40 - 44	42	40	105
45 - 49	37	35	106
50 & over	33	30	110

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SALARY ADJUSTMENTS

Merit Scale: The current assumption for merit salary increases is based on a member's length of service. Generally, the observed data will show that merit increases in the early years tend to be greater than increases later in the career.

The merit salary scale shown on the following pages is assumed in addition to general wage inflation.

Each graph is based on the total wage increases during the observation period. Then we eliminated the ultimate growth rate for each group to arrive at the observed rate of merit increases. For this purpose, we estimated the ultimate rate of wage growth based on the average salary increases of members with at least 20 years of service. This assumes that there are no merit increases for members with 20 or more years of service.

In the chart below each graph, we compare this observed merit increase with the current assumption. Note that the years 11 through 15 and 16 through 20 were combined to generate more credible information.

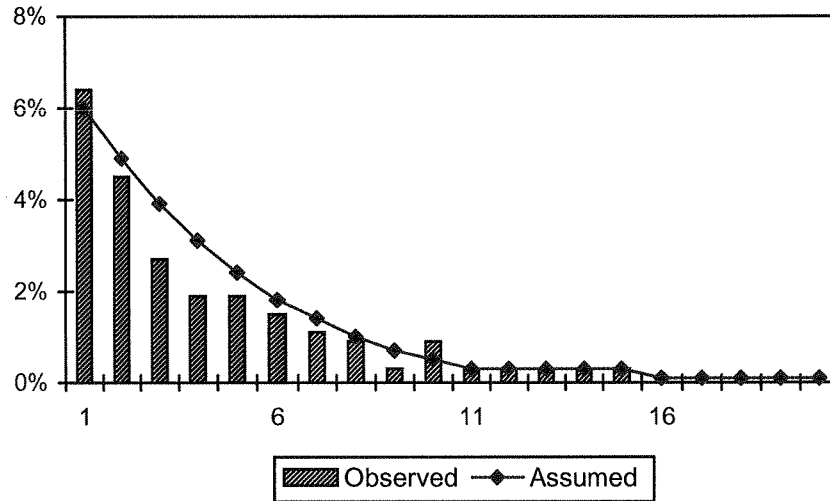
Except for a few of the early years of membership, the observed merit salary increases were fairly close to the assumed rates of increase. Due to the relatively short observation period we believe this may have resulted from the current economic environment and may not represent the longer-term prospects.

We are not recommending any changes to the merit salary scale at this time. In addition, we will continue to assume that JRS members do not receive merit salary increases.

MONTANA PUBLIC EMPLOYEES RETIREMENT ADMINISTRATION

2003 EXPERIENCE STUDY

PERS Members



Merit Salary Scale - PERS Members

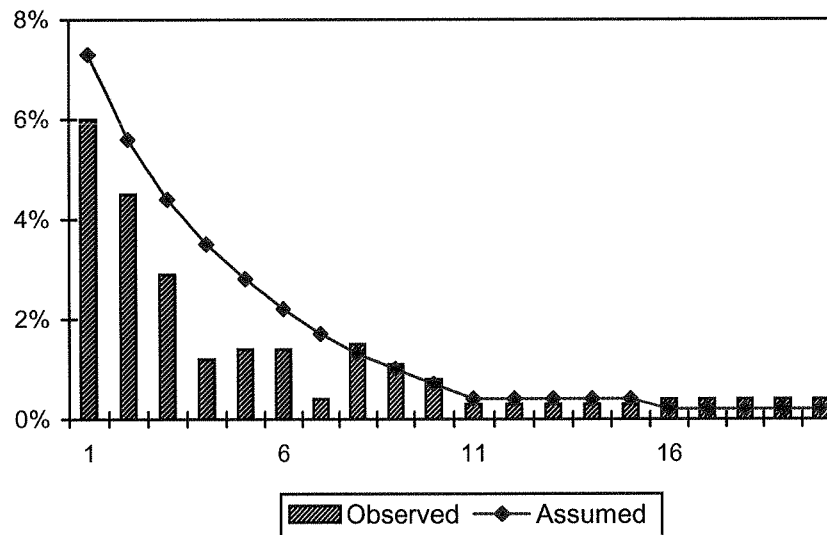
Service	Observed Increases	Merit Scale
1	6.4%	6.0%
2	4.5	4.9
3	2.7	3.9
4	1.9	3.1
5	1.9	2.4
6	1.5	1.8
7	1.1	1.4
8	0.9	1.0
9	0.3	0.7
10	0.9	0.5
11-15	0.3	0.3
16-20	-0.01	0.1
After 20	0.0	0.0

Observed Ultimate Growth Rate during the observation period: 4.53%

MONTANA PUBLIC EMPLOYEES RETIREMENT ADMINISTRATION

2003 EXPERIENCE STUDY

Uniformed Members



Merit Salary Scale - Uniformed Members

Service	Observed Increases	Merit Scale
1	6.0%	7.3%
2	4.5	5.6
3	2.9	4.4
4	1.2	3.5
5	1.4	2.8
6	1.4	2.2
7	0.4	1.7
8	1.5	1.3
9	1.1	1.0
10	0.8	0.7
11-15	0.3	0.4
16-20	0.4	0.2
After 20	0.0	0.0

Observed Ultimate Growth Rate during the period: 4.74%